



## Climate indices, rainfall onset and retreat, and malaria in Nigeria

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### Abstract:

**BACKGROUND & OBJECTIVES:** Rainfall in western sub-Saharan Africa is related to seasonal shifts of the Inter-tropical Convergence Zone, which moves northward early in the year, retreating in the second half of the year. The objective of the present study was to determine significant relationships between onset and retreat timing and climate indices. The relationship between timing and malaria case reporting was then evaluated. **METHODS:** Relationships between published rainfall onset and retreat dates for Nigeria from 1971- 2000 were evaluated in relation to pairs of climate indices using response surface analysis. Graphical representation of the response surface in relation to the underlying data was used to identify instances of overfitting. Association of onset and retreat timing with published case reporting records was evaluated using graphical and correlation analysis. **RESULTS:** Onset timing and rate of advance were related to ENSO (El Nino-Southern Oscillation), in combination with the Northern Annular Mode (NAM), while retreat timing was related to NAO (North Atlantic Oscillation), in combination with the East Pacific (EP) or West Pacific (WP) index, depending on location. Later onset was associated with faster northward progression of onset. Retreat date at Kano, the most northerly of the study locations, increased over the period 1990-2000, with higher case reporting for Nigeria as a whole being associated with the last three years of that period. **INTERPRETATION and CONCLUSION:** Rainfall retreat occurs much faster than onset, with onset and retreat timing and rate of onset advance being related to combinations of climate indices rather than to a single index. Threshold for determining a "rainy" day would influence results. The increase in national case reporting with delayed retreat at Kano may be related to the extension of the short transmission period in the north.

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### Resource Description

#### Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

#### Exposure :

weather or climate related pathway by which climate change affects health

El Nino Southern Oscillation, Extreme Weather Event, Precipitation

# Climate Change and Human Health Literature Portal

## **Geographic Feature:** ☒

resource focuses on specific type of geography

None or Unspecified

## **Geographic Location:** ☒

resource focuses on specific location

Non-United States

**Non-United States:** Africa

**African Region/Country:** African Country

**Other African Country:** Nigeria

## **Health Impact:** ☒

specification of health effect or disease related to climate change exposure

Infectious Disease

**Infectious Disease:** Vectorborne Disease

**Vectorborne Disease:** Mosquito-borne Disease

**Mosquito-borne Disease:** Malaria

## **Mitigation/Adaptation:** ☒

mitigation or adaptation strategy is a focus of resource

Adaptation

**Population of Concern:** A focus of content

## **Population of Concern:** ☒

populations at particular risk or vulnerability to climate change impacts

Low Socioeconomic Status

## **Resource Type:** ☒

format or standard characteristic of resource

Research Article

## **Timescale:** ☒

time period studied

Time Scale Unspecified

## **Vulnerability/Impact Assessment:** ☒

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content